

What is claimed is:

1. A steering wheel mounting assembly, comprising:
a first stationary ring having a first bearing and a first cylindrical raceway;
a second stationary ring having a second bearing and a second cylindrical raceway and
being constructed and arranged to be fixed to a vehicle frame;
a steering hub having a spindle with a radial flange extending therefrom, the spindle
being constructed and arranged for connection with a steering shaft and the radial flange
being constructed and arranged for connection with a steering wheel, the spindle having a
first bearing raceway to engage the first bearing and a second bearing raceway to engage the
second bearing, the radial flange having at least one opening that defines a bearing surface;
and
at least one friction roller assembly having a shaft with a third bearing thereabout,
wherein the friction roller assembly is positioned in the opening such that as the third bearing
rotates relative to the bearing surface, the third bearing moves radially outward and the shaft
engages the first and second cylindrical raceways.
2. The steering wheel mounting assembly of claim 1, further comprising a cage
constructed and arranged to minimize skewing of the friction roller assembly.
3. The steering wheel mounting assembly of claim 2, wherein the cage comprises a
plurality of plate members and a plurality of wall members between the plate members.
4. The steering wheel mounting assembly of claim 1, wherein the first stationary ring
includes means for mounting at least one vehicle component.

5. A steering wheel mounting assembly, comprising:

a first stationary ring member;

a second stationary ring member constructed and arranged to be mounted to a vehicle frame;

a steering hub member having a first member and a second member, the first member being constructed and arranged to be mounted to a steering shaft, the second member being constructed and arranged to be mounted to a steering wheel; and

at least one friction roller assembly receivable by the steering hub member and comprising at least one rotatable element, the friction roller assembly being constructed and arranged to be in frictional contact with a portion of the steering hub member, a portion of the first stationary ring member, and a portion of the second stationary ring member,

wherein, in use, when the steering wheel is rotated in a first orientation, the at least one rotatable element is constructed and arranged to rotate in a second orientation counter to the first orientation, such that the first stationary ring member remains in phase with the second stationary ring member.

6. The steering wheel mounting assembly of claim 5, wherein, in use, substantially zero backlash is produced at frictional contacts within the steering wheel mounting assembly.

7. The steering wheel mounting assembly of claim 5, wherein the first member comprises a spindle and the second member comprises a radial flange extending from the spindle.

8. The steering wheel mounting assembly of claim 5, wherein the first stationary ring member has a first bearing and a first cylindrical raceway, and the second stationary ring member has a second bearing and a second cylindrical raceway.

9. The steering wheel mounting assembly of claim 8, wherein the first member has a first bearing raceway to engage the first bearing and a second bearing raceway to engage the second bearing.

10. The steering wheel mounting assembly of claim 9, wherein the second member has at least one opening that defines a bearing surface.

11. The steering wheel mounting assembly of claim 10, wherein the friction roller assembly has a shaft with a third bearing thereabout, and wherein the friction roller assembly is positioned in the opening such that, in use, as the third bearing rotates relative to the bearing surface, the third bearing moves radially outward and the shaft engages the first and second cylindrical raceways.

12. The steering wheel mounting assembly of claim 5, wherein the rotatable element comprises a shaft with a bearing thereabout.

13. The steering wheel mounting assembly of claim 5, wherein the steering wheel mounting assembly comprises at least three friction roller assemblies.

14. The steering wheel mounting assembly of claim 5, further comprising means for minimizing skewing of the friction roller assembly.

15. The steering wheel mounting assembly of claim 14, wherein the minimizing means comprise a cage.

16. The steering wheel mounting assembly of claim 5, wherein the first stationary ring member includes means for mounting at least one vehicle component.

17. The steering wheel mounting assembly of claim 16, wherein the vehicle component comprises an air bag assembly.

18. The steering wheel mounting assembly of claim 5, wherein the steering hub member is rotatably supported by the second stationary ring member.

19. A method of producing counter rotation relative to a steering wheel, the method comprising:

providing a first stationary ring member;

mounting a second stationary ring member to a vehicle frame;

mounting a first member of a steering hub member to a steering shaft;

mounting a second member of the steering hub member to a steering wheel; and

installing at least one friction roller assembly in the steering hub member such that the friction roller assembly is in frictional contact with a portion of the steering hub member, a portion of the first stationary ring member, and a portion of the second stationary ring member, and such that, in use, when the steering wheel is rotated in a first orientation, a rotatable element of the friction roller assembly rotates in a second orientation counter to the first orientation, such that the first stationary ring member remains in phase with the second stationary ring member.

20. The method of claim 19, further comprising installing a cage to confine at least one end of the friction roller assembly.